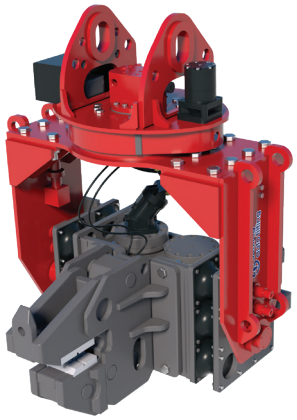
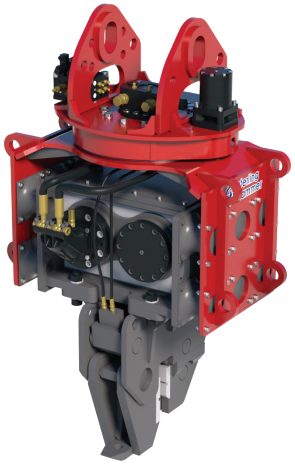
www.sterlingripper.com

STERLING TECHNOLOGY
PRESENTATION & PRODUCT LINE


sterling technology

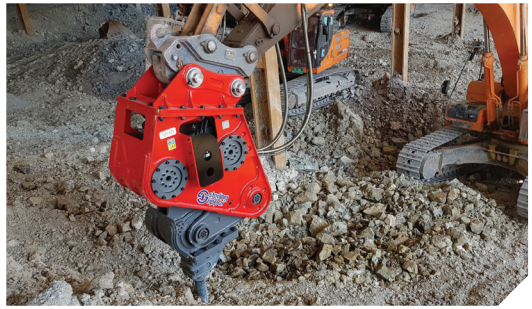
STERLING RIPPER

JOB APPLICATION

Significantly wider offering & 4 market segments enable further success!

MINING

DOWNTOWN CONSTRUCTION



TUNNEL CONSTRUCTION

UNDER WATER OPERATION

STERLING RIPPER

Sterling Ripper literally means excellent and outstanding rock breaking equipment!

Sterling Ripper offers three options in Tip type for soft & medium hard-rock, Chisel type for hard-rock for hard-rock, and Compactor type for compacting ground. Single Sterling Ripper body has three optional tools! you can simply change it at site any time depending on rock types and various application!

Tip(tooth) type

Chisel type

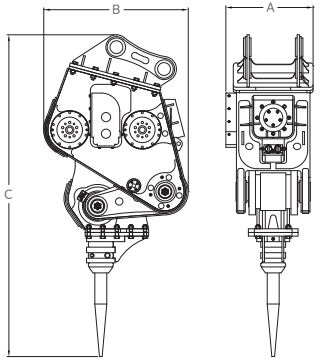
Model	Unit	SR25	SR30	SR40	SR50	SR80
Operating weight	Kg	2620	3450	4440	5600	10500
	lb	5776	7606	9789	12346	23149
Dimension [A x B x C]	mm	787 x 1148 x 2870	863 x 1321 x 3231	915 x 1401 x 3385	1060 x 1554 x 3665	1404 x 1600 x 4100
	inch	30.98 x 45.20 x 112.99	33.98 x 52.01 x 127.20	36.02 x 55.16 x 133.27	41.73 x 61.18 x 144.29	55.28 x 63.00 x 161.42
Chisel diameter Ø	mm	110	120	130	140	180
	inch	4.33	4.72	5.12	5.51	7.09
2nd relief setting pressure**	Bar	250	250	280	280	300
	Psi	3626	3626	4061	4061	4351
Operating pressure	Bar	180 - 220	180 - 220	210 - 250	210 - 250	240 - 270
	Psi	2610 - 3190	2610 - 3190	3045 - 3626	3045 - 3626	3481 - 3916
Oil flow	lpm	170 - 200	180 - 220	240 - 280	250 - 310	500 - 560
	gpm	45-53	47-58	63 -74	66 - 82	132 - 148
Frequency	bpm	2,500 ~ 3,500	2,500 ~ 3,200	2,000 ~ 2,800	2,000 ~ 2,800	2,200 ~ 2,500
Air spring nitrogen pressure	Bar	4	5	5	5	5
	Psi	58	72	72	72	72
Suitable carrier	ton	20~25	28 ~ 34	36 ~ 43	46 ~ 60	70 ~ 90
	lb	44092 ~ 55115	61729 ~ 74957	79366 ~ 94798	101412 ~ 132277	154323 ~ 198416

※ Specifications above are subject to change without notice.

UNIQUE CARTILAGE-LINK STRUCTURE AND DOUBLE BEARING STRUCTURE OF STERLING RIPPER

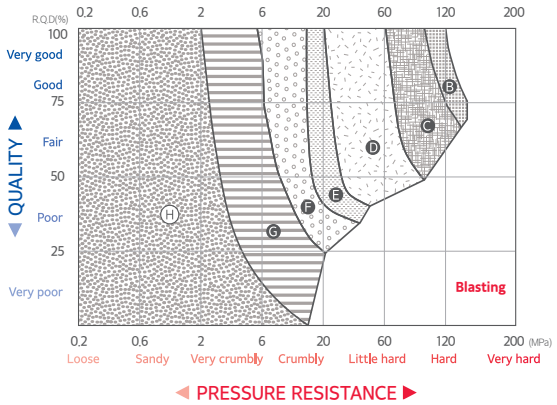
- Maximizing productivity and minimizing down time by on-site parts replacement
- Minimizing vibration transmitted to excavator and operator even at hard-rock
- Keeping constant and high productivity at hard-rock job site
- Rigid and higher durability at hard-rock job site

Compactor type



COMPARISON CHART

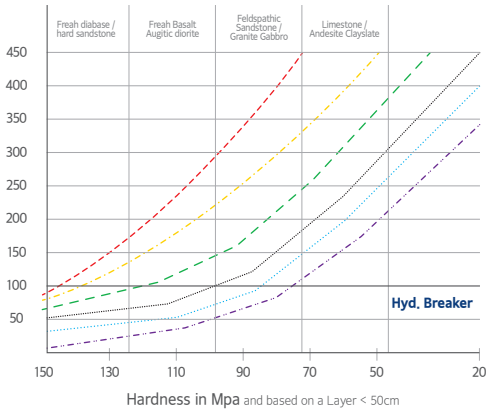
▶ Available equipment for rock hardness



Big class Sterling Ripper can work well at hard-rock without problems most vibratory rippers have, thanks to its cutting-edge technology, Unique cartilage-Link

Model	B	C	D	E	F	G
Hyd. Breaker	•	•	•	•	•	•
Sterling Ripper	•	•	•	•	•	•
Vibro Ripper		•	•	•	•	•
Dozer				•	•	•
Bucket						•

▶ Sterling Ripper VS Hydraulic breaker



The bigger class of Sterling Ripper, the much higher productivity and hydraulic breaker up to soft medium hard-rock and perform well at hard-rock job site compared to hyd. breaker

	SR80
	SR50
	SR40
	SR30
	SR25
	SR15

STRONG PIONTS OF STERLING RIPPER

· Higher productivity than hydraulic breaker
- 2 ~ 8 times better productivity than hyd. breaker depending on type of rocks

· More powerful than other vibratory rippers
- Unique structure and design specially bigger and centered eccentric weight enable - Sterling Ripper most powerful Ripper in the same class

· Selective tool options - Three tools for one Ripper
- Chisel type for hard rock, Tip(Tooth) type for soft & mid hard-rock and Compactor type for compacting ground
- Three optional tools enables Sterling Ripper to offer wider selections of application than competitors at rock breaking job sites

· Minimum vibration to excavator and operator at hard-rock
- Unique Cartilage-link of Sterling Ripper allows more powerful striking force but less vibration transmitted to excavator and operator
- Less impact to excavator and less fatigue to operator

· Minimum noise
- Sterling Ripper's Unique Cartilage-link structure technology allows minimum noise at mas. 90db and downtown building construction can be done without restrictions

· Easy on-site maintenance & low maintenance cost
- Concise structure of components and double bearing structure
- Most parts can be replaced at job site
- No need to return it to repair shop
- Less number of parts than competitors enable low maintenance cost
- Maximum productivity can be achieved by reducing down time by on site parts replacement and fast tip(Tooth) replacement

· Under water operation without special devices
- All kinds of work under water can be done without any expensive and complicated preparations

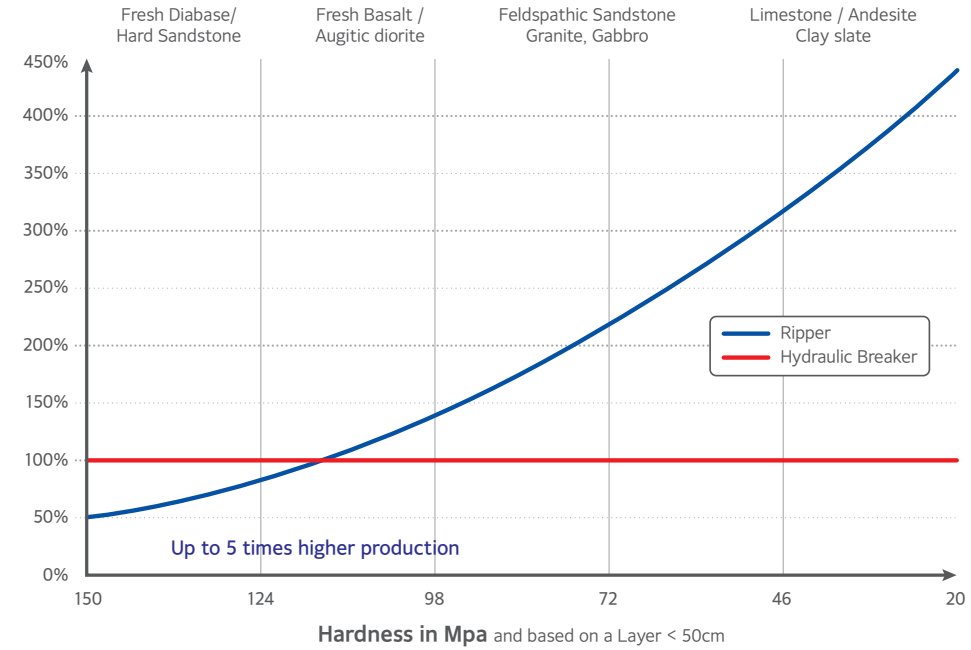
HYD. BREAKER vs VIBRATORY RIPPER

▶ Vibratory Ripper's advantages compared to Hyd. Breaker

· Higher productivity than hydraulic breaker

- Up to 5 times higher productivity than hyd. breaker at less hardness rock formation
- The bigger class of Ripper, the higher productivity
- The less hard rock formation, the higher productivity
- Constant high bpm by vibratory power

Productivity Comparison Chart



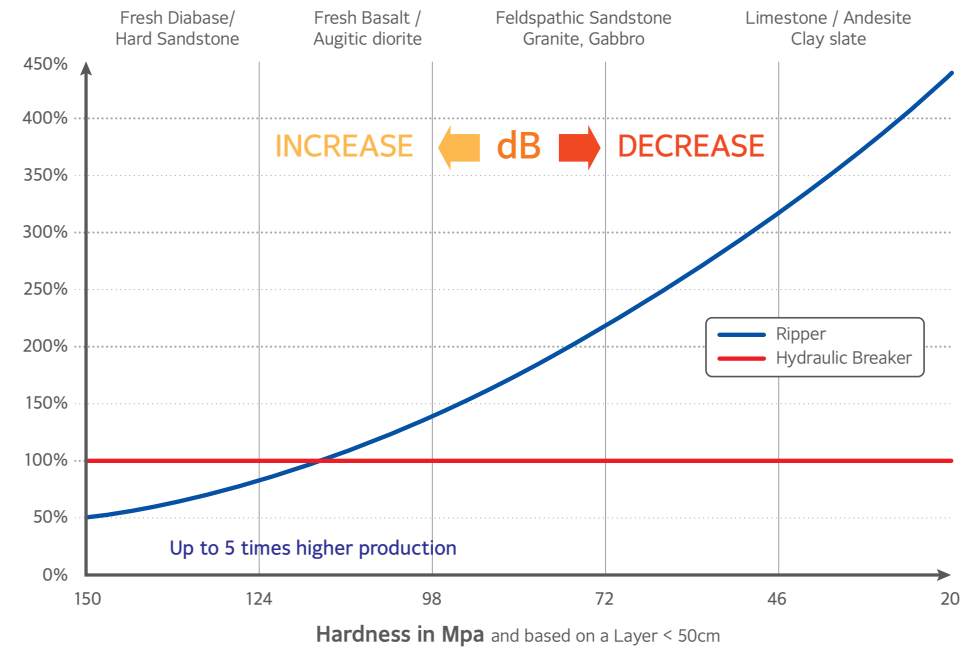
HYD. BREAKER vs VIBRATORY RIPPER

▶ Vibratory Ripper's advantages compared to Hyd. Breaker

· Higher productivity than hydraulic breaker

- 10~30% less noise than hyd. Breaker
- Less noise(under 90dB) than silent hyd. Breaker
- The less hard rock formation, the less noise
- Minimizing noise at job site allows demolition work in downtown or noise restricted area

Noise comparison chrat



HYD. BREAKER vs VIBRATORY RIPPER

▶ Vibratory Ripper's advantages compared to Hyd. Breaker

· Under water operation without special devices

- All kinds of work under water can be done without any expensive and complicated preparations.
- No need to invest on renting or purchasing air compressors. ex) USD150 ~ 450 per day
- No need to spend fuel cost for air compressors. ex) 50liter diesel per hour x 8 hours = USD400 ~ 500 per day

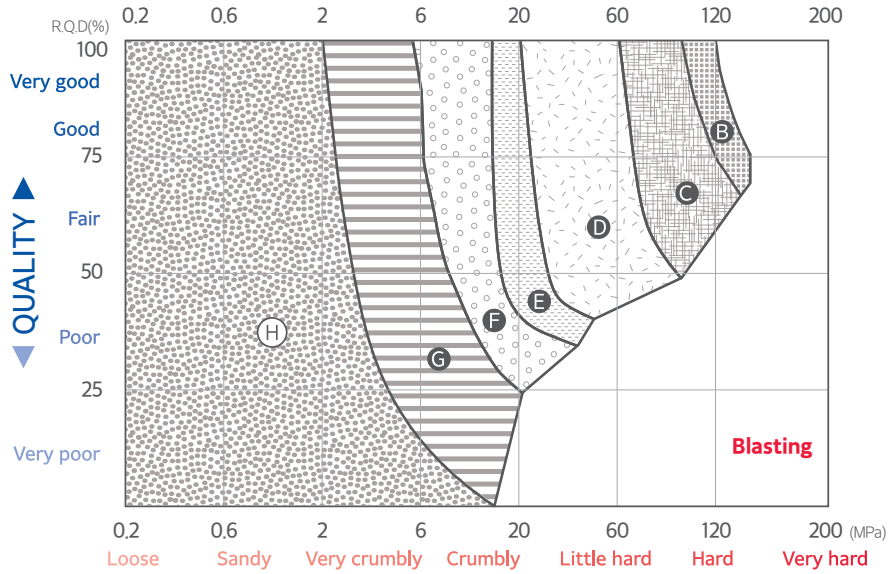
Air Compressor

HYD. BREAKER vs VIBRATORY RIPPER

▶ Vibratory Ripper's draw back compared to Hyd. Breaker

· Lower productivity than hydraulic breaker at hard-rock job sites
· Frequent breakdown in operation at hard-rock job sites due to repulsion energy and constant fatigue to links and bearings of Ripper
· Impact or damage to excavator and increasing operator's fatigue due to vibration and repulsion transmitted to the excavator and the operator

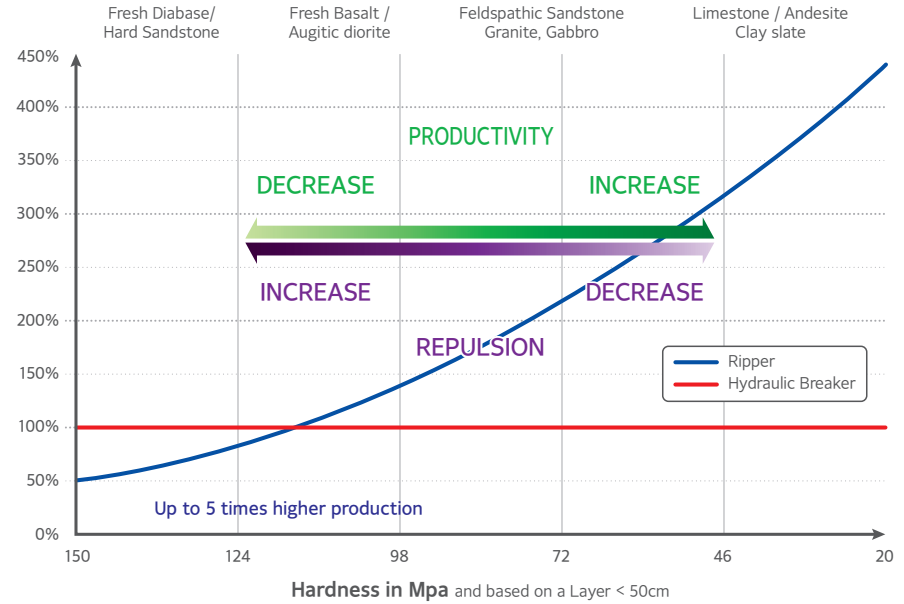
Available equipment for rock hardness



◀ PRESSURE RESISTANCE ▶

Model	B	C	D	E	F	G
Hyd. Breaker	•	•	•	•	•	•
Sterling Ripper	•	•	•	•	•	•
Vibro Ripper		•	•	•	•	•
Dozer				•	•	•
Bucket						•

Repulsive force comparison chart according to productivity



VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

· Solution for lower productivity than hydraulic breaker at hard-rock job sites

Solution	How to do & Effect
Maximize vibration power	- Change the size of eccentric weights and hyd. motorto maximize centrifugal force - Change the shape of eccentric weights to maximize centrifugal force - Optimize correlation between hyd. motor and eccentric weights - Maximize durability of components which can withstand extra impact due to power increase
Selective tool options -Two tools for one Ripper	- Chisel type for hard rock and Tip(Tooth)type for Soft & mid hard rock - Two optional tools enables Sterling Ripperto offer wider selections of application than competitors at rock breaking job sites

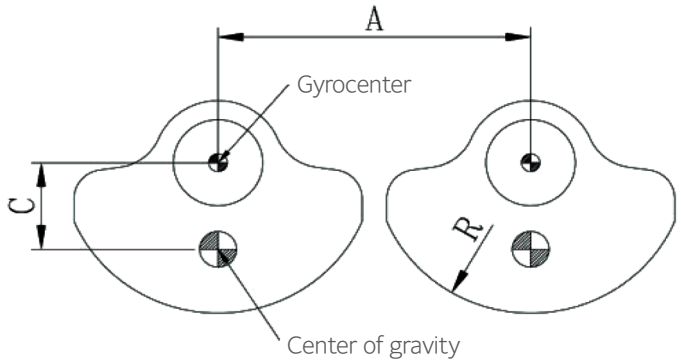
STERLING RIPPER'S
DOUBLE BEARINGS

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

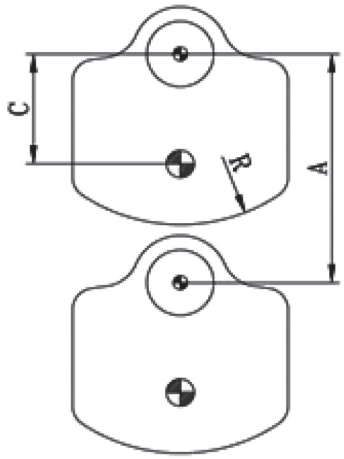
· Solution for lower productivity than hydraulic breaker at hard-rock job sites

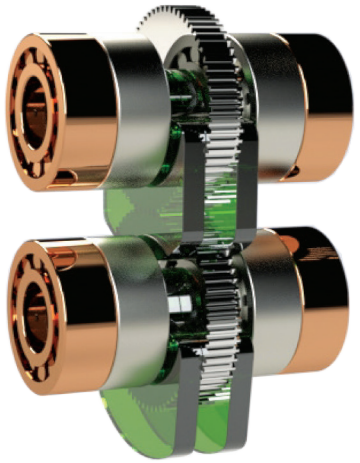
Conventional Ripper eccentric weights



VS

Sterling Ripper eccentric weights





By maximizing vibration power

	Conventional Ripper eccentric weights	Sterling Ripper eccentric weights
R distance (from center of gravity to edge)	R < A/2	R > A/2
Shape of eccentric weights	Semicircle	Long board shape and double eccentric weights
C distance (from gyrocenterto center of gravity)	C distance is short	C distance is long
Outcome and effect	Low centrifugal force = Low vibration power	High centrifugal force = High vibration power

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

· Solution for frequent breakdown in operation at hard-rock job sites due to repulsion energy and constant fatigue to links and bearings of Ripper

· Solution for impact or damage to excavator and increasing operator's fatigue due to vibration and repulsion transmitted to the excavator and the operator

Solution	How to do & Effect
Cartilage-link structure	- Use damper cushions with a link instead of bearings with the links to get less repulsion, less noise and no chance of link bearing broken & easy on-site maintenance
Double bearing structure	- Unique design of double bearing structure allows at least 2 times longer life time of bearings
Centered double eccentric weights	- Unique design of centered double eccentric weights allow better durability of bearings

VIBRATORY RIPPER vs STERLING RIPPER

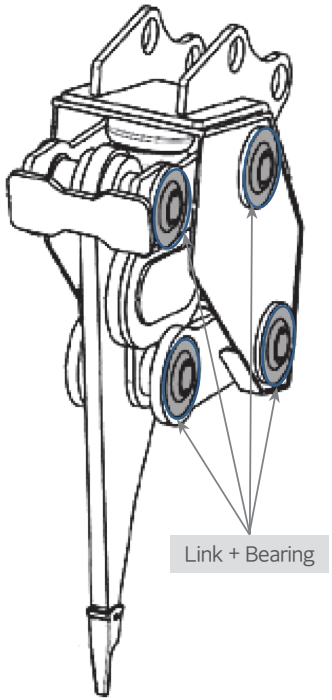
▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

Solution	How to do & Effect
Cartilage-link structure	- Use damper cushions with a link instead of bearings with the link to get less repulsion, less noise and no chance of link bearing broken & easy on-site maintenance

Conventional Ripper

Main drawback of the link bearing structure

The links and bearings break easily working at hard-rock job sites and Ripper should be sent to maintenance shop to fix it. It takes a lot time and cost which affect total operating cost eventually

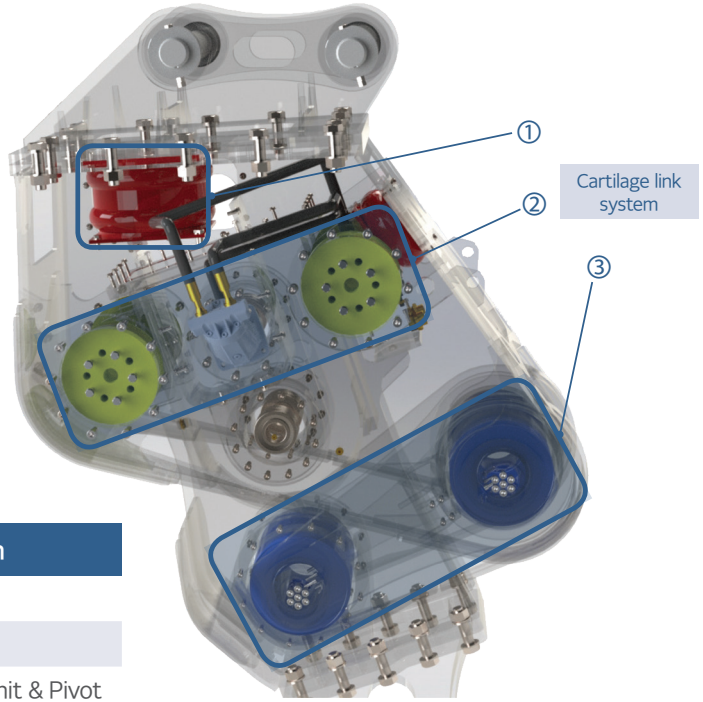


VS

Sterling Ripper

Main advantage of the cartilage link type

Sterling Ripper has adopted damper cushions with a link type instead of link bearing type. It is a very simple process of replacing cushions by simple unscrewing and screwing covers on-site, which allows can save a huge down time and maintenance cost



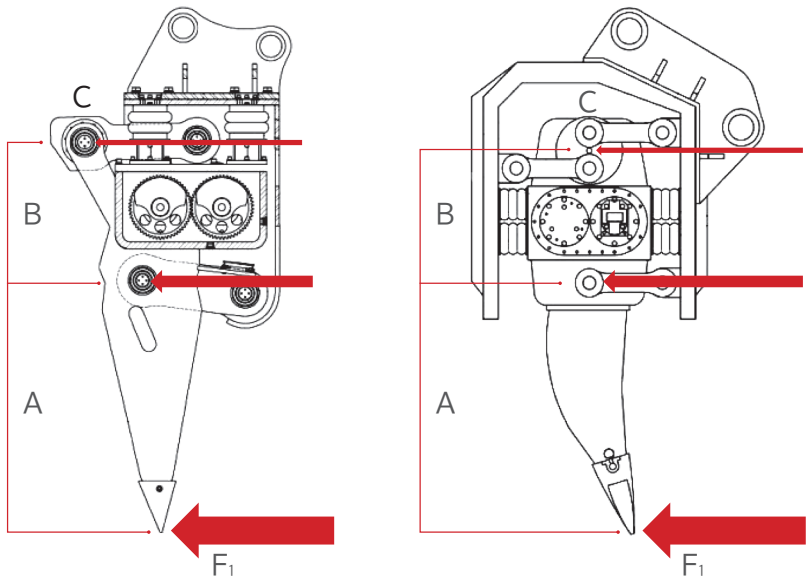
Cartilage link system	
Component 1	Air Spring
Component 2	Rubber Thrust
Component 3	Anti-vibration unit & Pivot

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

Solution	How to do & Effect
Cartilage-link structure	- Use damper cushions with a link instead of bearings with the link to get less repulsion, less noise and no chance of link bearing broken & easy on-site maintenance

Conventional Ripper



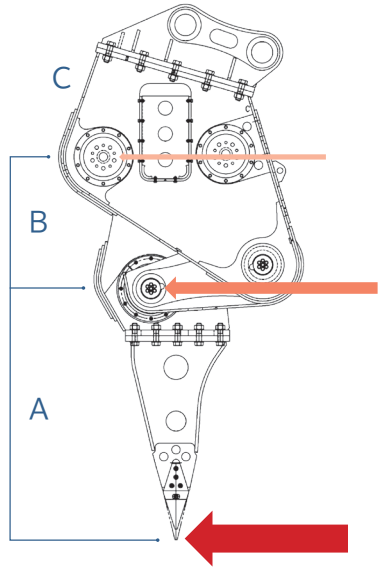
Main drawback of the Link structure

F1 * A= B * C Thus, the farer distance A is, the more load on C.

Tugging rocks and soil causes huge load to upper links and bearings due to principle of levers. The load increase at hard-rock job sites and it damages to the links and bearings. When links and bearings are broken, they should be sent to maintenance shop and it takes long time to fix it with a lot of cost. And vibration is easily transmitted to excavator and operator through the links.

VS

Sterling Ripper



Main advantage of the cartilage link type

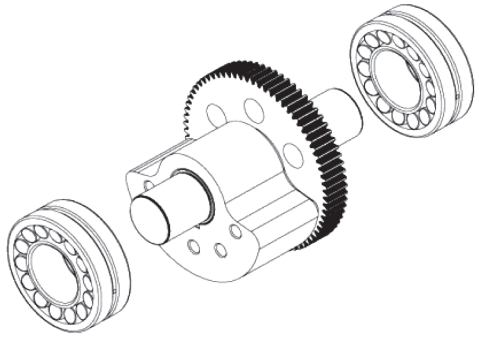
In the cartilage-link type of Sterling Ripper, one link and dampers disperse load and reduce vibration transmitted to excavator and operator. So cartilage-link type protect from impact and damage to excavator and minimize operator's fatigue. And the damper cushions can be replaced on-site and it takes short time to maintenance with few cost. Most importantly it is not necessary sent to maintenance shop and maximize productivity by cutting down time so much.

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

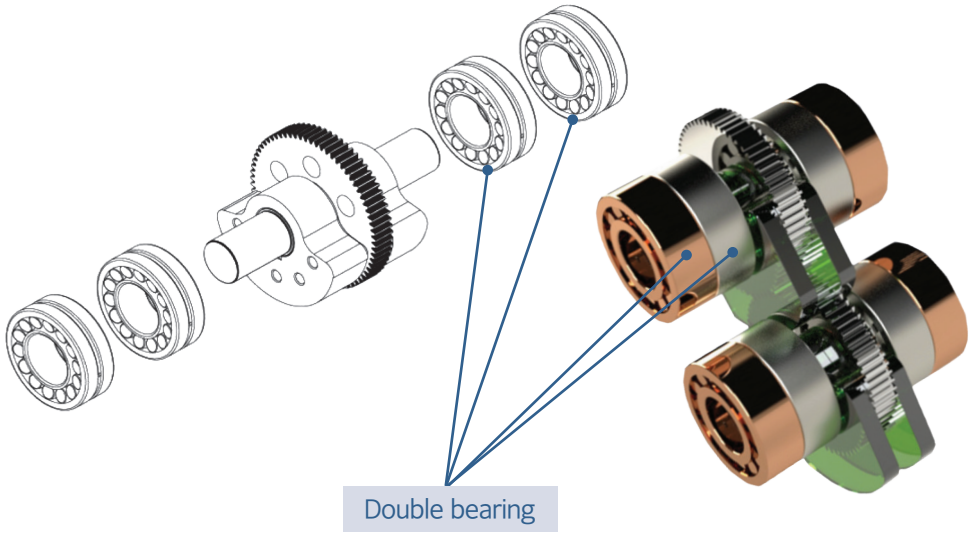
Solution	How to do & Effect
Double bearing structure	- Unique design of double bearing structure allows at least 2 times longer life time of bearings

Conventional Ripper's bearings



VS

Sterling Ripper's bearings



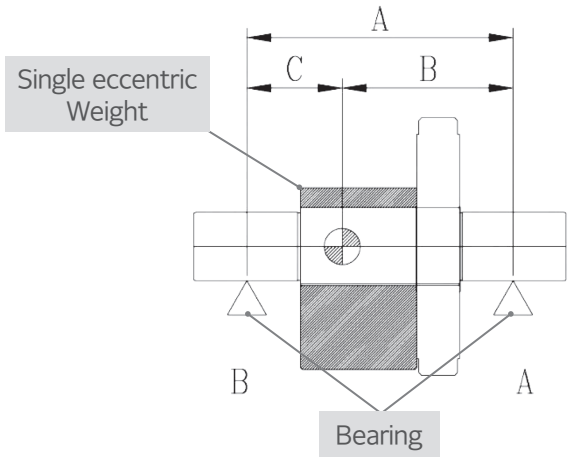
	Conventional Ripper's bearings	Sterling Ripper's bearings
Number of bearing	Single bearing per each side of axis	Double bearing per each side of axis
Advantages	-	High vibratory power at the same size of bearings
	-	At least two times longer life time of bearings
	-	Higher durability at hard-rock job sites

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

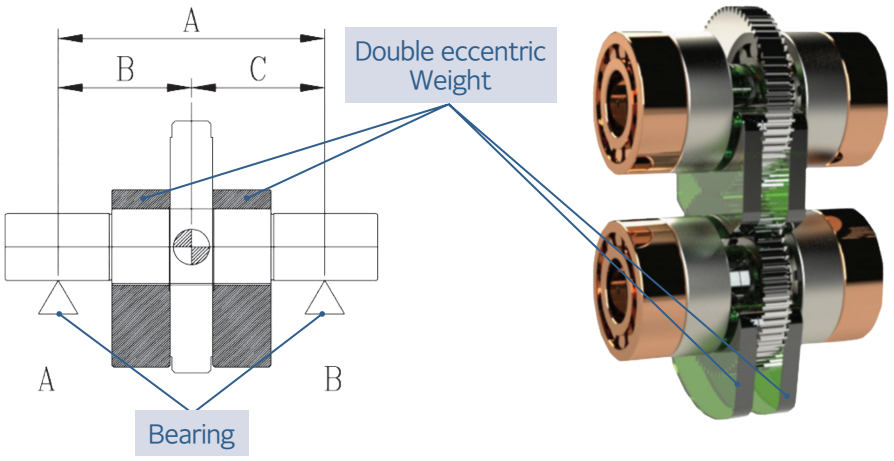
Solution	How to do & Effect
Centered double eccentric weights	- Unique design of centered double eccentric weights allow better durability of bearings

Conventional Ripper's eccentric weights



VS

Sterling Ripper's eccentric weights



	Conventional Ripper's bearings	Sterling Ripper's bearings
Distance from axis A	A=B+C, B >C	A=B+C, B =C
Center of gravity	B and C ≠ A/2	B and C = A/2
Weight distribution	"Bearing B" has more weight than "bearing A"	Weight of "A bearing" and "B bearing" is the same
Effect	Life time of both "A bearing" and "B bearing" is shorten due to imbalance of their weight	Longer life time of both "A bearing" and "B bearing"

VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

· Solution for lower productivity than hydraulic breaker at hard-rock job sites - By Chisel type Sterling Ripper

Solution	How to do & Effect
Double bearing structure	- Unique design of double bearing structure allows at least 2 times longer life time of bearings

- Sterling Ripper offers three options in Tip type for soft & medium hard-rock, Chisel type for hard-rock, and Compactor type for compacting ground. You can simply change it at site any time depending on rock types and various application!

Tip Type

Compactor Type

Chisel Type

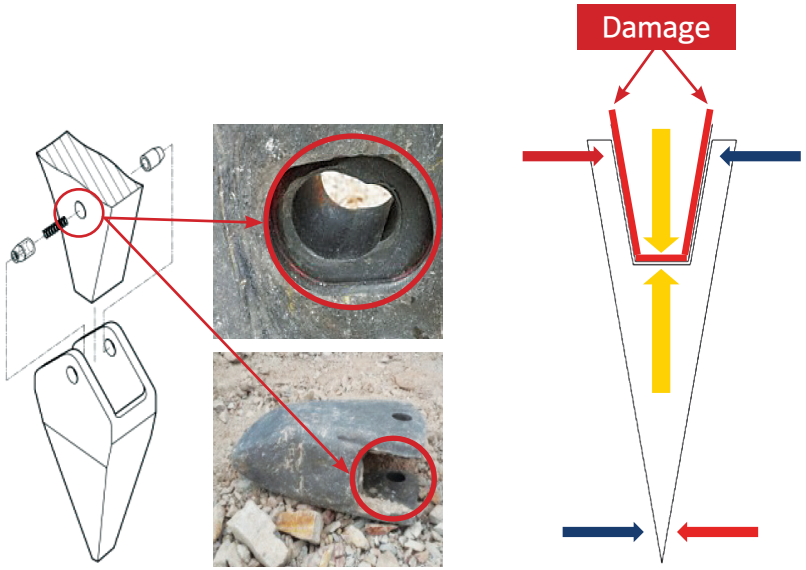
VIBRATORY RIPPER vs STERLING RIPPER

▶ Solution of Sterling Ripper for Vibratory Ripper's drawback

· Solution for lower productivity than hydraulic breaker at hard-rock job sites - By Chisel type Sterling Ripper

Solution	How to do & Effect
Bolting type tooth	- Bolt type of diamond-shape tip(tooth) enables fast and easy replacement of the tip

Conventional Ripper tooth Type (Conventional Ripper)



VS

Bolting type tooth (Sterling Ripper)

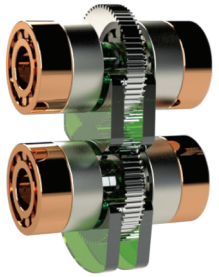
- When stoppers/pins are loosen due to vibration, they are likely to be broken and it leads to damage to tooth
- It is difficult to replace new tooth to used one as holes work loose and damages occur to surface of tooth and gum. It takes long time to replace the tooth and cause long down time

- Bolting type tooth minimize loosening and damage to surface of tooth and gum so it is convenient and easy to replace the tooth. It maximizes productivity by cutting down down-time

VIBRATORY RIPPER vs STERLING RIPPER

▶ Summary of Sterling Ripper's selling point

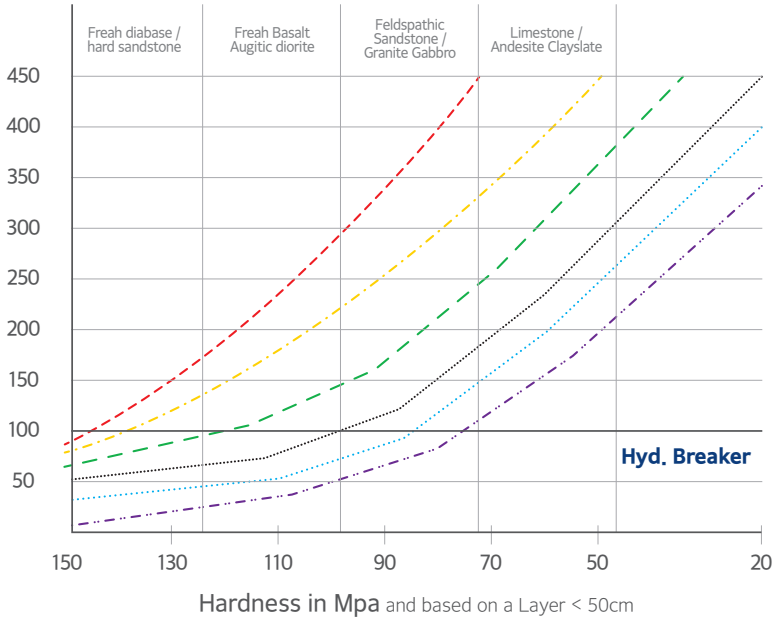
Feature	How to do & Effect
Optimum shape and size of Sterling Ripper's eccentric weights	- Maximize vibration power by optimizing centrifugal force
Selective tool options - Three tools for one Ripper	- Chisel type for hard rock, Tip(Tooth) type for Soft & mid hard rock and Compactor type for compacting ground - Three optional tools enables Sterling Ripper to offer wider selections of application than competitors at rock breaking job sites and compacting ground - It can be simply replaced on site as occasion demands
Unique Cartilage-link structure and double bearing structure of Sterling Ripper	- Easy maintenance - On site parts replacement - Concise structure of components - Maximize vibration power by optimizing centrifugal force - Minimizing vibration transmitted to excavator and operator even at hard-rock - Minimizing noise (15% ~ 20% lower noise than traditional vibratory ripper)
Double bearing structure	- Unique design of double bearing structure allows at least 2 times longer life time of bearings
Centered double eccentric weights	- Unique design of centered double eccentric weights allow better durability of bearings
Bolt type of diamond-shape tip(tooth)	- Bolt type of diamond-shape tip(tooth) enables fast and easy replacement of the tip. - Maximum productivity can be achieved by reducing down time by on-site parts replacement and fast tip(tooth) replacement



VIBRATORY RIPPER vs STERLING RIPPER

▶ Summary of Sterling Ripper's selling point

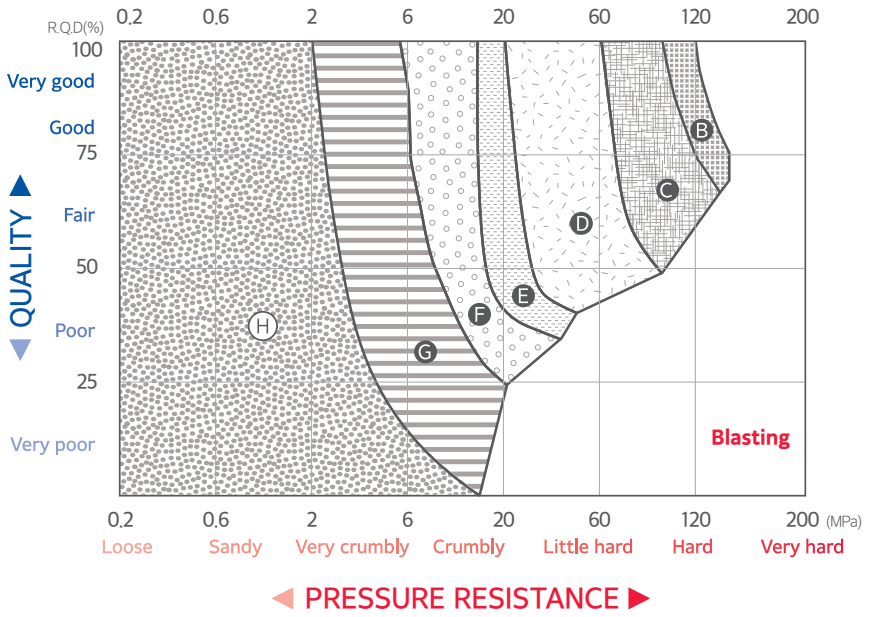
Sterling Ripper vs Hydraulic breaker



	SR80
	SR50
	SR40
	SR30
	SR25
	SR15

The bigger class of Sterling Ripper, the much higher productivity and hydraulic breaker up to soft medium hard-rock, and perform well at hard-rock job site compared to hyd. breaker

Available equipment for rock hardness



Model	B	C	D	E	F	G
Hyd. Breaker	•	•	•	•	•	•
Sterling Ripper	•	•	•	•	•	•
Vibro Ripper		•	•	•	•	•
Dozer				•	•	•
Bucket						•

Big class Sterling Rippers can work well at hard-rock without problems most vibratory rippers have, thanks to its cutting-edge technology, Damper+Link structure

STERLING PEOPLE!

STERLING PRODUCTS!

STERLING SERVICE!

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sterling technology

www.sterlingripper.com Inquiry : sterling@sterlingripper.com